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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/781,092
Filing Date: February 17, 2004
Appellant(s): WIPPERSTEG ET AL.

Michael J. Striker
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 20, 2010 appealing from the Office action mailed July 20, 2010.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 2, 5, 6, 8-14, and 18-24 are pending and appealed.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds

of rejection (if any) listed under the subheading “WITHDRAWN REJECTIONS.” New grounds of rejection (if any) are provided under the subheading “NEW GROUNDS OF REJECTION.”

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant’s brief.

(8) Evidence Relied Upon

5,712,782	Weigelt et al.	1-1998
6,553,300 B2	Ma et al.	4-2003
6,192,283 B1	Holowko	2-2001

(9) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

Claims 2 5-6, 8-14, and 18-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Weigelt et al. (U.S. Patent No. 5,712,782) in view of Ma et al. (U.S. Patent No. 6,553,300 B2) and Holowko (U.S. Patent No. 6,192,283 B1)**.

As per claim 24, Weigelt is directed to a method of optimization of adjustable parameters of at least one machine using a diagnosis data processing system **(column 6, lines 13-24)**, comprising the following steps: processing the machine-internal data and machine-external data by the data processing system in consideration of the target data **(column 7, lines 1-39)**; generating further-processible output data **(column 7, lines 1-39)** obtaining optimized adjustable parameters **(column 7, lines 30-34)**; and using the optimized adjustable parameters for indication to an operator or for adjustment of the at least one

machine **(column 7, lines 34-39)** thereby creating and executing a process algorithm **(column 4, lines 48-55)** but fails to explicitly disclose wherein machine-internal data, machine-external data, target data and combinations thereof are grouped into defined situation patterns, selecting a process algorithm by comparing the detected instant situation pattern to situation patterns to identify a situation pattern most closely corresponding to the instant situation pattern and the process algorithm corresponding thereto and executing the identified process algorithm to optimize the machine adjustable parameters for the detected instant situation pattern.

Ma teaches defining a plurality of situation patterns for the process algorithms by at least a part of data selected from the group consisting of machine-internal data, machine-external data, target data and combinations thereof over time **(column 5, lines 29-58, set of settings to remember, new situations to be applied in the neuro-fuzzy inference system)**, selecting a situation pattern which comes close or is identical to an instantaneous situation pattern and a process algorithm linked to the situation pattern, depending on the at least one part of the machine-interior data and machine-exterior data with consideration of the target data which defines at least a part of an instantaneous situation pattern **(column 5, lines 29-58, input to the system, information from on-board sensors and microcontrollers, using neuro-fuzzy inference system with neural network and column 6, lines 1-9, target ranges)** and executing the identified process algorithm to optimize the machine adjustable parameters for the detected instant situation pattern. **(column 6, lines 6-11)**.

The neuro-fuzzy inference system includes a neural network. Well known to an ordinary person skilled in the art, a neuro inference system must first be trained. When a new combination of input variables are input into the neuro inference system, the structure of the neuro inference system is adjusted, creating a solution path. Each subsequent encounter of that same combination of input variables will result in the same solution as being outputted. Therefore, a situation pattern, which would be one

combination of values of multiple parameters, would be defined and tied to a process algorithm with the structure of the neuro inference system. Column 5, lines 21-27:

> FIG. 5B shows membership functions for the inputs/output parameters. The membership functions map inputs and output to their membership values. The membership functions can be decided by knowledge and later adjusted based on a tuning strategy, or by other means such as neural networks.

And also in column 5, lines 40-58:

> The system 210 (FIG. 6) is shown using one neuro-fuzzy inference system 270 with six outputs a–f. The system 270 can have a single neuro-fuzzy inference system with six outputs or six single-output neuro-fuzzy inferences systems. Inputs to the system 270 include harvesting conditions and crop properties (such as crop type, location, and grain yield) from the operator interface 154 and information from the on-board sensors 157 and microcontrollers 158.
>
> The system 210 is an adaptive neuro-fuzzy inference system which essentially functions as a fuzzy inference system but has additional learning ability from neural networks. Newly learned harvester experience is automatically integrated into the inference system. As pointed out previously, when the supervisory controller 212 learns a new set of settings to remember, a signal is sent via line 220 to the system 210 which then adapts the inference system to incorporate the new situation. The controller 212 sends an inquiring signal via line 222 when asking for the settings from the system 210.

Using the neuro-fuzzy inference system with the learning ability from neural networks, the inference system adapts to incorporate new situations (or situation patterns) as they are encountered. Thus, the plurality of situation patterns are built into the inference system over time instead of being predefined all at once. Column 5, lines 59-61:

> The controller 200 provides closed-loop control. In addition, the controller 200 has the ability to learn and adapt the neuro-fuzzy inference system.

The fuzzy rule based system involving fuzzy matching allows parameters that are approximate to but not exactly matching parameter values, allowing the system to identify a stored situation pattern most closely corresponding to the instant situation pattern.

> The algorithm for each fuzzy rule based controller **244a–244f** consists of four steps:
>
> 1. Fuzzy matching (fuzzification): calculate the degree to which the input data match the condition of the fuzzy rules;
> 2. Inference: calculate the conclusion of the rule based on the degree of match;
> 3. Combination: combine the conclusion inferred by all fuzzy rules into a final conclusion; and
> 4. Defuzzification: convert a fuzzy conclusion into a crisp one.

Weigelt and Ma are analogous art because they are both from the same field of endeavor, optimizing control of an agricultural machine and are both trying to solve the same problem of automatic control. It would have been obvious to an ordinary person skilled in the art at the time of the invention to combine the method of optimization of adjustable parameters of at least one machine of Weigelt with the selection of process algorithms method steps of Ma in order to eliminate the need for constant operator monitoring and regular adjustment and reduces operator fatigue **(Ma, column 2, lines 49-53)**.

However, the combination of Weigelt and Ma fails to explicitly disclose initially defining a plurality of specified situation patterns according to data selected from a group consisting of data involved in a control process (which is not a claimed but argued limitation); defining a plurality of process algorithms that modify current parameter settings to optimized parameter settings, each of which corresponding to one of the plurality of specific situation patterns; detecting an instant situation pattern according to sampled data selected from the group consisting of machine and target data; selecting a process algorithm from the plurality of stored process algorithms by comparing the detected instant situation pattern to the stored situation patterns to identify both a stored situation pattern most closely corresponding to the instant situation pattern and the process algorithm corresponding thereto.

Holowko teaches initially defining a plurality of specified situation patterns according to data selected from a group consisting of data involved in a control process within a table **(column 11, lines 19-21)**; defining a plurality of process algorithms that modify current parameter settings to optimized parameter settings, each of which corresponding to one of the plurality of specific situation patterns

within the same table **(column 11, lines 25-32)**; detecting an instant situation pattern according to sampled data selected from the group consisting of machine and target data **(column 11, lines 10-14)**; selecting a process algorithm from the plurality of stored process algorithms by comparing the detected instant situation pattern to the stored situation patterns to identify both a stored situation pattern most closely corresponding to the instant situation pattern and the process algorithm corresponding thereto **(column 11, lines 15-43)**. Weigelt, Ma and Holowko are analogous art because they are all from the same field of endeavor, optimization of adjustable parameters. It would have been obvious to an ordinary person skilled in the art at the time of the invention to combine the method of optimization of adjustable parameters of at least one machine of Weigelt and Ma with the defined situation patterns and process algorithms of Holowko in order to provide a more simple and efficient method of optimizing parameters **(Holowko, column 2, lines 48-52)**.

As per claim 2, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising determining the optimization of the adjustable parameter by target data selected from the group consisting of editable target data, and storable target data **(Weigelt, column 7, lines 1-39)**.

As per claim 5, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of editing and storing the machine-internal data, the machine-external data and the output data by the diagnosis data processing system **(Weigelt, column 7, lines 1-39)**.

As per claim 6, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of operating the diagnosis data processing system in a time controlled manner **(Weigelt, column 5, lines 24-33)**.

As per claim 8, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of using a traveling speed, a rotary speed of at least one

threshing drum and/or the rotary speed of a blower of at least one cleaning device as the adjustable parameters to be optimized **(Weigelt, column 5, lines 24-33)**.

As per claim 9, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of using a crop-specific and/or machine-specific parameter as the further parameter; and performing the determination of the further parameter by sensors which are in operative communication with the machine or by inputting **(Weigelt, column 5, lines 48-59)**.

As per claim 10, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 9; further comprising the step of using a parameter selected from the group consisting of a grain loss, a grain throughput, a crop moisture, a crop total throughput and a broken corn portion as the further parameter **(Weigelt, column 7, lines 40-55)**.

As per claim 11, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 9; further comprising the step of using adjustment regions for parameters of working units of the machine as the further parameter **(Weigelt, column 6, lines 13-24)**.

As per claim 12, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 5; further comprising the step of generating the machine-external data by external systems and using plant-specific data, geographic data, weather data and/or external expert knowledge as the machine-external data **(Weigelt, column 2, lines 40-55)**.

As per claim 13, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 12; further comprising the step of using crop and/or data and experience knowledge as the external expert knowledge and as internal expert knowledge **(Weigelt, column 7, lines 30-39)**.

As per claim 14, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of processing a diagnosis selected from the group

consisting of process diagnosis, case diagnosis, and model-oriented diagnosis, with the chosen process algorithm of the diagnosis data processing system **(Weigelt, column 8, line 60 – column 9, line 7)**.

As per claim 18, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of generating changed process algorithms generation by the data processing system depending on machine-interior data and machine-exterior data and with consideration of changeable target data **(Ma, column 5, lines 34-61)**.

As per claim 19, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of generating changed specific situation patterns by the data processing system in dependence on machine-interior data and machine-exterior data and with consideration of changeable target data **(Ma, column 5, lines 29-58)**.

As per claim 20, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of storing process algorithms, specific situation patterns or both in data sets, wherein the data sets include at least a part of machine-internal data, machine-external data and target data **(Ma, column 5, lines 29-58 and Holowko, column 11, lines 15-43)**.

As per claim 21, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of incorporating in diagnosis data processing system specific situation patterns and associated process algorithms and/or optimized adjustable parameters to be available for further machines **(Ma, column 5, lines 29-58 and Holowko, column 11, lines 15-43)**.

As per claim 22, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24, wherein the machine is an agricultural harvester; further comprising defining at least one process algorithm depending on harvesting conditions of the agricultural harvester **(Weigelt, column 5, lines 40-59)**.

As per claim 23, the combination of Weigelt, Ma, and Holowko already discloses a method as defined in claim 24; further comprising the step of adapting the processing algorithm by analysis and evaluation **(Weigelt, column 8, lines 15-19)**.

(10) Response to Argument

Appellants argue a variety of reasons in support of their position that the claimed limitations are not taught or rendered obvious by the cited prior art combination. In particular, Appellants argue:

(A) Various advantages of the claimed invention.

(B) Ma does not teach defining a plurality of specified situation patterns according to data selected from a group consisting of machine-internal data, machine-external data, target data and combinations thereof.

(C) Ma does not teach selecting a situation pattern which comes close or is identical to an instantaneous situation pattern.

(D) Ma does not teach selecting a situation pattern and a process algorithm depending on the at least one part of the machine-internal data, machine-external data with consideration of the target data which defines at least part of an instantaneous situation pattern.

(E) There is no rational underpinning for modifying Weigelt to incorporate the teachings of Ma.

(F) Holowko does not teach detecting an instant situation pattern from machine-internal data, machine-external data and combinations thereof.

(G) Holowko does not teach selecting a process algorithm from a plurality of stored process algorithms by comparing.

(I) There is no rational underpinning for modifying Weigelt as proposed to be modified by Ma to incorporate the teachings of Holowko.

(A) Various advantages of the claimed invention are found in the disclosure of the prior art.

On page 12 of the Appeal Brief, Appellants discuss the advantage of the claimed method of saving time and taking decision making as to how the machine should be adjusted in view of machine internal and machine external conditions, out of the hands of an operator. The prior art of record also possesses these advantages. See **Weigelt column 2, lines 35-55, Ma, column 2, lines 49-52, and Holowko, column 2, lines 48-52 and column 2, line 66- column 3, line 3**.

The Examiner also notes Appellants admission of the prior art teaching of the limitations of machine-internal data and machine-external data to obtain optimized adjustable parameters on page 13 of the Appeal brief, 1st and 2nd paragraphs.

(B) Ma teaches defining a plurality of specified situation patterns according to data selected from a group consisting of machine-internal data, machine-external data, target data and combinations thereof through the use of a neuro-fuzzy inference system which includes a neural network.

On pages 14-15, the Appellants argue that by generating a set of set points to drive the low-level controllers, the fuzzy logic controllers do not disclose defining a plurality of specified situation patterns. As elaborated above in Section (9), the neural network within the neuro-fuzzy inference system creates solution paths for a situation pattern when the situation pattern is first encountered. However, once that solution path has been created, that particular situation pattern is now tied to that particular process algorithm. Therefore, by creating a solution path for a set of values consisting a situation pattern, the situation pattern is defined, the process algorithm for that situation pattern is defined, and the association between the situation pattern and process algorithm is defined. The generation of the appropriate set of set points in Ma is the generation of a process algorithm but in doing so, the situation pattern for that set of set points has been defined within the structure of the neural network as well.

(C) Ma teaches selecting a situation pattern which comes close or is identical to an instantaneous situation pattern.

On pages 14-16, the Appellant argue that because fuzzy logic controllers do not operate as traditional processors, they do not select algorithms. As elaborated above in Section (9), the selection of a process algorithm occurs within the use of the neuro-fuzzy inference system used by the logic controllers. In using the neuro-fuzzy inference system to select a set of setpoints, the controllers are selecting a process algorithm. The set of setpoints will be sent to low level controllers so that the setpoints of the low level controllers are adjusted accordingly. Therefore, the selection of the set of setpoints of which the controllers must be set to results in the selection of a process algorithm of setting the low level controllers to those setpoints. Whether or not fuzzy logic controllers operate as traditional processors is irrelevant to whether or not a process algorithm is selected.

(D) It is not necessary that Ma teach selecting a situation pattern and a process algorithm depending on the at least one part of the machine-internal data, machine-external data with consideration of the target data which defines at least part of an instantaneous situation pattern.

On pages 15-16 of the Appeal Brief, Appellants argue the aforementioned limitation. However, Appellants are arguing limitations not claimed; claim 1 only requires that the instant situation pattern is selected from the group consisting of machine-internal data, machine-external data, target data and combinations thereof, and does not require that machine-internal or external data must be considered with consideration of the target data. Likewise, claim 1 only requires that a process algorithm is selected based on the identification of a stored situation pattern (which includes machine-internal data, machine-external data, target data and combinations thereof), not that the selection must depend on machine-internal or external data with consideration of the target data which defines at least part of an instantaneous situation pattern.

(E) Motivation exists to modifying Weigelt to incorporate the teachings of Ma, rendering claim 1 obvious.

In pages 16-17 of the Appeal Brief, Appellants argue that no rational underpinning exists to combine the teachings of Weigelt with Ma because the modifications to Weigelt to Ma is not a simple task. However, whether or not the modifications are a simple task is not the test of obviousness, only that one of ordinary skill in the art would be capable of making said modifications and achieve predictable results. Weigelt and Ma are both in the same field of endeavor, controlling agricultural machines. Weigelt and Ma are both solving the same problem, automatic control. Weigelt and Ma are both concerned with optimizing operation parameters of the agricultural machines. The Appellants have not show how or why one of ordinary skill in the art at the time of the invention would be incapable of making the necessary modifications to combine Weigelt and Ma. In fact, Appellants have disclosed all necessary steps to make the modifications to allow for the combinations on page 17 of the Appeal Brief, 1st paragraph.

Furthermore, in view of the Graham v. Deere analysis and the application of the teaching, suggestion, motivation test (see above rejection in Section (9)), the motivational statement of relieving an operator of a task of monitoring, thereby reducing operator error and labor costs is one step of the objective reasoning required by KSR. It is one element of the TSM test which as held by KSR, still a valid test for obviousness.

(F) Although Holowko does so, it is not necessary that Holowko teach detecting an instant situation pattern from machine-internal data, machine-external data and combinations thereof.

In page 19 of the Appeal Brief, Appellants argue that Holowko does not teach detecting an instant situation pattern from machine-internal data, machine-external data, and combinations thereof as claimed.

However, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The combination of Weigelt and Ma teach wherein situation patterns include machine-internal data, machine-external data and combinations thereof including the defined situation patterns and the instant situation patterns.

Furthermore, Appellants only merely allege that Holowko does not teach detecting an instant situation pattern from machine-internal data, machine-external data and combinations thereof. The current status must include either machine-internal data, machine-external data, or a combination of thereof. No other type of data within a control system (in this case an injection molding machine) exists. Furthermore, because the status Sc can comprise a range of values and can be indicative of a number of conditions, depending on the types and number of measurements used to determine the status (see column 9, lines 15-19), Holowko teaches detecting an instant situation pattern, Sc from machine-internal data, machine-external data, and combinations thereof.

(G) Holowko teaches selecting a process algorithm from a plurality of stored process algorithms by comparing.

Appellants argue that Holowko does not teach selecting a process algorithm because an output OA is selected regardless of the method used. Appellants have misunderstood the teachings of Holowko. Holowko teaches the output selection process in **column 9, lines 39-65**.

> The adjustment function 25 compares the current status S_c of the system, obtained from the logic or rules of logic function 26, and determines whether the current status matches a prior status S_p stored in memory 34. If the current status S_c does not match a saved prior status S_p, a predetermined output can be selected and provided as the output O_A to the heater 16. If the current status S_c does match a prior system status S_p, the prior output PO and prior result R corresponding to the matched prior status are obtained and used to determine the output O_A to the heater 16. The adjustment function 25 adjusts the prior output PO corresponding to the matched prior status S_p by an adjustment factor A, the factor A being dependent upon the prior result R obtained. Thus, for example, if the current status of the injection molding machine10 is S_{c8}, the adjustment function 25 will look in memory 34 to determine if current status S_{c8} had been encountered before. If so (i.e., there is an entry for S_{p8}), the adjustment function 25 will adjust prior output PO_8 (corresponding to the output attempted for S_{p8}) by an amount A, and provide this adjusted output O_A to the heating element 16. The amount A is based upon the result R_8 that was achieved from the prior output PO_8, and that is also saved in memory unit 34. The result R is obtained by monitoring the machine 10, through sensor 18, after each output is provided to the heater 16. The result R can comprise temperature data measured, error and/or slope values calculated, or the system status S_c obtained.

Therefore, Holowko teaches matching up the current Status Sc with a prior status Sp. If the current status matches a prior status, the prior output PO is selected. Therefore Holowko teaches selecting a process algorithm when the instant situation pattern is identical to a stored situation pattern. By matching situation patterns that are identical, Holowko teaches identifying a stored situation pattern that most closely corresponds to the instant situation pattern. What Holowko does not provide for is a matching of a closest but not identical situation pattern, but the neuro-fuzzy inference system of Ma teaches said method of matching similar situation patterns, as shown in Section (9) above.

<u>(I) Motivation exists to modifying Weigelt as proposed to be modified by Ma to incorporate the teachings of Holowko, rendering Claim 1 obvious.</u>

On page 20 of the Appeal Brief, Appellants argue that in order to accommodate the database-centric operation of Holowko, significant modification would be required. As noted in Section E above, whether or not the modifications are a simple task is not the test of obviousness, only that one of ordinary skill in the art would be capable of making said modifications and achieve predictable results. Appellants have not shown how or why one of ordinary skill in the art at the time of the invention would be

incapable of such modifications (which are not a physical modification but rather a software modification) or that such modifications would render unpredictable results.

Furthermore, Appellants merely allege that Holowko would render Weigelt unsatisfactory for its intended purpose or at least change Weigelt's respective principles of operation with no support. As Holowko, Weigelt, and Ma are all concerned with optimizing parameters within an at least partially automated control system, the combination of the prior art of record would not render Weigelt unsatisfactory of its intended purpose or change its principles of operation.

Whether or not an external controller communicates to other machines telemetrically is irrelevant to whether or not Weigelt can accommodate the database-centric operation. In fact, Appellants have failed to show how the database-centric operation of selecting a process algorithm would interfere with the telemetric communication process of Weigelt to obtain machine-internal or machine-external data.

Finally, as noted in Section E above, in view of the Graham v. Deere analysis and the application of the teaching, suggestion, motivation test (see above rejection in Section (9)), the motivational statement of providing a more simple and efficient method of optimizing parameters, thereby reducing operational costs is one step of the objective reasoning required by KSR. It is one element of the TSM test which as held by KSR, still a valid test for obviousness.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Kamini S Shah/

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